Efficacy Review

Date: March 18, 2010

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Risk Manager Rev.: Clayton Myers

Products: Attractive Toxic Sugar Bait

EPA Reg. #: 85125-R

A.I.'s: Boric Acid (4.0%)

Decision #: 422597

DP #: 371558

Submission: R310, New Products, RD Science Review

MRIDs: Submitted: 47901402

GLP: No

MRID 47901402

Title: The response of Mosquitoes species – *Cx. pipiens* (Diptera: Culicidae) to "Attractive Toxic Sugar Bait".

Guideline: OPPTS 810.3400

Materials and Methods: The registrant has submitted data from 2 studies; one was a supplemental sugar preference study, and the other an efficacy study for the submitted product for attracting and killing adult mosquitoes. For the efficacy study, "50-300 *Cx. pipiens* females and males" were released into a "whitewashed" room. Mosquitoes were exposed to test substance baits for 24-48 hours. The room apparently had windows to the outdoors, and so releases were made 2 hours after dark, but ambient light would have been present afterwards. Adults were starved 24 hours prior to release. A treated and control cup were placed in the room, with each colored with a different dye, for determination of which cups the mosquitoes visited. Test was replicated 6 times. Colored and uncolored mosquitoes were counted after each exposure period and scored as dead or alive.

Study Summary of the Results: A table summarizes the number of dead mosquitoes by color as well as dead mosquitoes without any color

Entomologist's Observations/Discussion:

The data is not adequate to support kills claims against mosquitoes for a number of reasons:

1. Because no percent mortality is presented in any of the data tables, it is impossible to determine how what percentage of kill was achieved. In order to support a kills claim for mosquitoes, the bait must deliver greater than 90% mortality within 24 hours.
2. The report claims that the boric acid killed more than 80% of mosquitoes within 48 hours, but no calculations or support are given for this claim.
3. The study design does not include an adequate control group. While a non-treated sugar bait was placed in each room study as an alternative to the treated bait, there was no negative control for the effects of the bait on the mosquitoes. For a true control, there should have been a group where mosquitoes only had access to water or a comparable baited sugar solution sans boric acid. Mortality from this treatment should be statistically compared to the mortality observed in a borate treated group, and % kills must exceed 90% to support a claim.
4. Description of the room was inadequate:
    a. No units were given for the room dimensions
    b. Was the room sealed off from invading insects?
    c. What does "white washed" mean?
    d. What was the ambient photoperiod?
    e. What was the percent escape of mosquitoes?
5. Description of the mosquito colony and rearing practices was inadequate
6. Description of the number of mosquitoes exposed is inadequate (50-300 is a wide range) and should be described and justified for each replicate, when the level of replication is so variable.
7. Usage of male mosquitoes is inappropriate for such a study:
    a. Only females feed on blood, and thus females are the true pest to be controlled. Killing of male mosquitoes could artificially inflate the efficacy claim, as the only efficacy that is relevant is kill of females
    b. Use of mated females for a study is most appropriate than a mixed-sex study, because mated females tend to be more aggressive blood feeders than unmated females

<u>Overall Review of Label Claims and Directions</u>:

All references and claims related to mosquitoes must be removed from the label, including those in the proposed marketing claims, alternate product names, and directions for use.

It is recommended that if the registrant intends to conduct additional studies to support claims for this or other similar products against mosquitoes or other pests of public health significance, that a protocol be submitted to the Agency (under PRIA, R272 submission) for review prior to starting any new studies.